

WE CLAIM:

1. A blue colored, infrared and ultraviolet radiation absorbing glass composition having a composition comprising a  
5 base glass portion comprising:
- |    |                                |                             |
|----|--------------------------------|-----------------------------|
|    | SiO <sub>2</sub>               | 66 to 75 percent by weight, |
|    | Na <sub>2</sub> O              | 10 to 20 percent by weight, |
|    | CaO                            | 5 to 15 percent by weight,  |
|    | MgO                            | 0 to 5 percent by weight,   |
| 10 | Al <sub>2</sub> O <sub>3</sub> | 0 to 5 percent by weight,   |
|    | K <sub>2</sub> O               | 0 to 5 percent by weight,   |
- and a primary solar radiation absorbing and colorant portion comprising:
- |    |                                |  |
|----|--------------------------------|--|
|    | total iron                     | 0.6 to 2 percent by weight,            |
| 15 | FeO                            | 0.15 to 0.65 percent by weight,        |
|    | CoO                            | 30 to 250 PPM,                         |
|    | Se                             | present in an amount up to 15 PPM, and |
|    | TiO <sub>2</sub>               | 0 to 0.9 percent by weight,            |
|    | Nd <sub>2</sub> O <sub>3</sub> | 0 to 3 percent by weight               |
- 20 the glass having a redox in the range of 0.15 to 0.58, wherein at a redox range from 0.14 to 0.4, the range of CoO is from 60 to 250 PPM, and wherein at a redox range greater than 0.4, the CoO is in the range of 30 to 100 PPM, and wherein the glass has a luminous transmittance (LTA) of 35%  
25 up to 70%, and a color characterized by a dominant wavelength in the range of 479 to 495 nanometers and an excitation purity of at least 4% at a thickness of 0.160 inches.
2. The composition as in claim 1 wherein the total  
30 iron concentration is from greater than 0.9 to 1.3 weight percent.
3. The composition as in claim 2 wherein the total  
35 iron concentration up to 1.1 weight percent.

4. The composition as in claim 1 wherein, the FeO concentration is 0.20 to 0.50 weight percent.

5 5. The composition as in claim 1 wherein the CoO concentration is 60 to 130 PPM.

6. The composition as in claim 4 wherein the CoO concentration is 60 to 95 PPM.

10 7. The composition as in claim 1 wherein, the Selenium concentration is up to 12 PPM.

15 8. The composition as in claim 1 wherein, the TiO<sub>2</sub> concentration is 0 to 0.5 weight percent.

9. The composition as in claim 1 wherein the LTA is in the range of 45 to 55 percent.

20 10. The composition as in claim 1 wherein the composition has a redox of 0.35 to 0.55.

11. The composition as in claim 1 wherein the composition has a redox of 0.20 to 0.35.

25 12. The composition as in claim 1 wherein the dominant wavelength of the glass is in the range of 480 to 492 nanometers.

30 13. The composition as in claim 12 wherein the dominant wavelength of the glass is up to 489 nanometers.

35 14. The composition as in claim 1 wherein the total iron concentration is from 0.9 to 1.3 weight percent, the FeO concentration is 0.20 to 0.35 weight percent, and the CoO concentration is 60 to 90 PPM.

15. The composition as in claim 1 wherein the  $\text{TiO}_2$  concentration is 0.02 to 0.40 weight percent.

5        16. The composition as in claim 1 wherein the glass has a total solar ultraviolet transmittance (TSUV) of 55 percent or less, a total solar infrared transmittance (TSIR) of 35 percent or less and a total solar energy (TSET) transmittance of 55 percent or less.

10       17. The composition as in claim 1 wherein the glass has a color characterized by a dominant wavelength in the range of 481 to 489 nanometers and an excitation purity of 8 to 30 percent at a thickness of 0.160 inches.

15       18. The composition as in claim 16 wherein the glass has a total solar ultraviolet transmittance (TSUV) of 40 percent or less, a total solar infrared transmittance (TSIR) of 25 percent or less and a total solar energy (TSET) transmittance of 40 percent or less, and the color of the glass is characterized by a dominant wavelength in the range of 482 to 487 nanometers and an excitation purity of 8 to 30 percent at a thickness of 0.160 inches.

20       19. The composition as in claim 1 wherein the glass has a total solar ultraviolet transmittance (TSUV) in the range of 20 to 40 percent, a total solar infrared transmittance (TSIR) in the range of 10 to 35 and a total solar energy transmittance (TSET) in the range of 25 to 45 percent or less at a thickness of 0.154 inches.

25       20. The composition as in claim 1 wherein, the Selenium concentration is up to 6 PPM.

21. A flat glass sheet formed by the float process from the glass composition recited in claim 1.

22. An automotive window formed from the flat glass sheet of claim 17.

23. A blue colored, infrared and ultraviolet radiation absorbing glass composition having a composition comprising a base glass portion comprising:

10	SiO <sub>2</sub>	66 to 75 percent by weight,
	Na <sub>2</sub> O	10 to 20 percent by weight,
	CaO	5 to 15 percent by weight,
	MgO	0 to 5 percent by weight,
	Al <sub>2</sub> O <sub>3</sub>	0 to 5 percent by weight,
15	K <sub>2</sub> O	0 to 5 percent by weight,

and a primary solar radiation absorbing and colorant portion comprising:

	total iron	0.6 to 2 percent by weight,
	FeO	0.15 to 0.65 percent by weight,
20	CoO	30 to 250 PPM,
	Se	present in an amount up to 15 PPM, and
	TiO <sub>2</sub>	0 to 0.9 percent by weight,
	Nd <sub>2</sub> O <sub>3</sub>	0 to 3 percent by weight,

the glass having a redox in the range of 0.15 to 0.55, wherein at a redox range from 0.14 to 0.4, the range of CoO is from 60 to 250 PPM, and wherein at a redox range greater than 0.4, the CoO is in the range of 30 to 100 PPM and wherein the glass has: a luminous transmittance (LTA) of 35% up to 60%,

30 a total solar ultraviolet transmittance (TSUV) of 55 percent or less,

a total solar infrared transmittance (TSIR) of 35 percent or less; and

35 a total solar energy (TSET) transmittance of 55 percent or less; and

a color characterized by a dominant wavelength in the range of 479 to 495 nanometers and an excitation purity of at least 4% at a thickness of 0.154 inches.

5           24. The composition as in claim 23 wherein the total iron concentration is from 0.9 to 1.3 weight percent, the FeO concentration is 0.20 to 0.50 weight percent, the CoO concentration is 60 to 100 PPM, the Selenium concentration is up to 12 PPM, and the dominant wavelength of the glass is in  
10 the range of 479 to 491 nanometers, and the LTA is in the range of 40 to 55 percent.

15           25. The composition as in claim 23 wherein the CoO concentration is 60 to 95 PPM.

26. The composition as in claim 23 wherein the selenium concentration is up to 6 PPM.

20           27. The composition as in claim 23 wherein, and the TiO<sub>2</sub> concentration is 0 to 0.5 weight percent.

28. The composition as in claim 23 wherein the composition has a redox of 0.15 to 0.35.

25           29. The composition as in claim 23 wherein the glass has a total solar ultraviolet transmittance (TSUV) of 40 percent or less, a total solar infrared transmittance (TSIR) of 25 percent or less and a total solar energy (TSET) transmittance of 45 percent or less.

30           30. The composition as in claim 29 wherein the glass has a color characterized by a dominant wavelength in the range of 482 to 487 nanometers and an excitation purity of 8 to 20 percent.

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31. The composition as in claim 23 wherein the glass has a total solar ultraviolet transmittance (TSUV) in the range of 20 to 40 percent, a total solar infrared transmittance (TSIR) in the range of 10 to 35 and a total solar energy transmittance (TSET) in the range of 25 to 45 percent or less at a thickness of 0.154 inches.

32. A flat glass sheet formed by the float process from the glass composition recited in claim 23.

33. An automotive window formed from the flat glass sheet of claim 23.

34. An automotive transparent glazing panel comprising:

at least one transparent panel selected from side and back transparent panels that is a blue colored, infrared and ultraviolet radiation absorbing glass composition having a composition comprising a base glass portion, comprising:

SiO <sub>2</sub>	66 to 75 percent by weight,
Na <sub>2</sub> O	10 to 20 percent by weight,
CaO	5 to 15 percent by weight,
MgO	0 to 5 percent by weight,
Al <sub>2</sub> O <sub>3</sub>	0 to 5 percent by weight,
K <sub>2</sub> O	0 to 5 percent by weight,

and a primary solar radiation absorbing and colorant portion comprising:

total iron	0.6 to 2 percent by weight,
FeO	0.15 to 0.65 percent by weight,
CoO	30 to 250 PPM,
Se	greater than 0 up to 15 PPM,
Nd <sub>2</sub> O <sub>3</sub>	0 to 3 percent by weight, and
TiO <sub>2</sub>	0 to 0.9 percent by weight,

the glass having a redox in the range of 0.15 to 0.58, wherein at a redox range from 0.15 to 0.4, the range of

CoO is from 60 to 250 PPM, and wherein at a redox range greater than 0.4, the CoO is in the range of 30 to 100 PPM and wherein the glass has a luminous transmittance (LTA) of 35% up to 60%, and a color characterized by a dominant wavelength in the range of 479 to 495 nanometers and an excitation purity of at least 4% at a thickness of 0.160 inches wherein the glazing panel has a thickness in the range of 1.5 to 10 millimeters.

35. Transparent glass glazing panel set for mounting on an automobile vehicle, comprising:  
a windshield,  
front side windows,  
rear side windows ;and  
a rear window,  
wherein at least one of the front side windows, rear side windows; or rear window has the glazing panel of Claim 34.

36. Transparent glass glazing panel set for mounting on an automobile vehicle, comprising:  
a windshield,  
front side windows,  
rear side windows ;and  
a rear window,  
wherein at least one of the front side windows, rear side windows; or rear window has the glass glazing panel with a glass composition that is blue-colored and infrared and ultraviolet radiation absorbing glass having a luminous transmission under illuminant A of 45 to 55 percent.

37. Transparent glass glazing panel set for mounting on an automobile vehicle, comprising:  
i) a windshield,

- ii) front side windows,
- iii) rear side windows ;and
- iv) a rear window,

wherein the panels of ii) iii) and iv) all are blue-  
5 colored and infrared and ultraviolet radiation absorbing  
glass wherein at least one of the set of panels of ii)  
and iii) have a luminous transmission under illuminant A  
of 45 to 55 percent, and at least one of the set of  
panels of iii) and iv) have a luminous transmission  
10 under illuminant A in the range of 20 to 45 percent.

38. Transparent glass glazing panel set of claim  
37 wherein the windshield is a blue colored infrared and  
ultraviolet radiation absorbing glass with a luminous  
15 transmission of greater than 65 percent.

39. Transparent glass glazing panel set of claim 36,  
wherein the panel set with the luminous transmission under A  
illuminant of 20 to 45 percent has a blue colored, privacy,  
20 infrared and ultraviolet radiation absorbing glass  
composition comprising a base glass portion comprising:

	SiO <sub>2</sub>	66 to 75 percent by weight,
	Na <sub>2</sub> O	10 to 20 percent by weight,
	CaO	5 to 15 percent by weight,
25	MgO	0 to 5 percent by weight,
	Al <sub>2</sub> O <sub>3</sub>	0 to 5 percent by weight,
	K <sub>2</sub> O	0 to 5 percent by weight,

and a primary solar radiation absorbing and colorant portion  
comprising:

30	total iron	0.9 to 2 percent by weight,
	FeO	0.15 to 0.65 percent by weight,
	CoO	90 to 250 PPM, and
	TiO <sub>2</sub>	0 to 0.9 percent by weight,

the glass having a luminous transmittance (LTA) of greater  
35 than 20% up to 45%, and a color characterized by a dominant

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wavelength in the range of 479 to 491 nanometers and an excitation purity of at least 4% at a thickness of 0.160 inches.

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